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**BEFORE THE BOARD OF PATENT APPEALS**

**AND INTERFERENCES**

Paper No. 18

Application Number: 08/568,904

Filing Date: 12/07/95

Appellant(s): Watts Jr.

# EXAMINER'S ANSWER

Ronald O. Neerings
For Appellant

# EXAMINER'S ANSWER

This is in response to appellant's brief on appeal filed 3/29/99.

*(1) Real Party in Interest*

A statement identifying the real party in interest is contained in the brief.

*(2) Related Appeals and Interferences*

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

*(3) Status of Claims*

The statement of the status of the claims contained in the brief is correct.

*(4) Status of Amendments After Final*

No amendment after final has been filed.

*(5) Summary of Invention*

The summary of invention contained in the brief is correct.

*(6) Issues*

The appellant's statement of the issues in the brief is correct.

*(7) Grouping of Claims*

Appellant's brief includes a statement that claims 2, 3, 5, 6, 9, 17-21, 23, 30, 31, 34-39, 41-43, 45-47, 49-51, 53-55, 57-59, 61-63, 65-67, and 71-73 do not stand or fall together and provides reasons as set forth in 37 CFR 1.192(c)(7) and (c)(8).

*(8) Claims Appealed*

The copy of the appealed claims contained in the Appendix to the brief is correct.

*(9) Prior Art of Record*

The following is a listing of the prior art of record relied upon in the rejection of claims under appeal.

| | | |
|---|---|---|
| 5,590,061 | Hollowell, II et al. | 12-1996 |
| 5,502,838 | Kikinis | 3-1996 |
| 5,493,684 | Gephardt et al. | 2-1996 |
| 5,422,806 | Chen et al. | 6-1995 |

*(10) Grounds of Rejection*

The following ground(s) of rejection are applicable to the appealed claims:

1. Claims 2-3, 5-6, 9, 30-31, 34-39, 41-43, 45-47, 49-51, 53-55, 57-59, 61-63, 65-67, and 71-73 are rejected under 35 U.S.C. § 103 as being unpatentable over Hollowell, II et al. in view of Kikinis and further in view of Gephardt et al.

As per claims 2, 3, 5, and 9, Hollowell discloses the claimed invention including a provision for user input (Fig. 1); a provision for output (Fig. 1); a CPU coupled to the input and output (Fig. 1; col. 4, lines 6-7); the input is a keyboard (Fig. 1; col. 4, lines 42-44); the output is a display device (Fig. 1; col. 4, lines 21-22); a temperature level detector (Fig. 1; col. 4, lines 47-48); and a thermal management system that stops the power to the CPU when the temperature detected exceeds a reference temperature (Abstract; Fig. 2). However, Hollowell

does not teach stopping the clock signals when a detected temperature rises above a reference temperature level. Kikinis teaches a system for controlling temperature buildup in an IC which employs a temperature sensor to provide an indication of the IC temperature to a control circuit which is configured to adjust the clock speed based upon a function of the temperature of the IC or its package (Abstract). Further, Kikinis teaches that it is known to selectively stop clock signals when the detected temperature rises above a reference temperature level (Abstract; Fig. 3, 6). It would have been obvious to one having ordinary skill in the art at the time the invention was made to include the selectively stopping the clock signals based upon rising temperatures exceeding a reference temperature as taught by Kikinis, to monitor the temperature levels in the computer, to prevent excessive temperature which may damage vital components or circuitry.

Hollowell and Kikinis disclose the claimed invention as discussed above. However, Hollowell does not teach a monitor stopping the clock signals to the CPU only when the CPU is not processing critical I/O. Gephardt teaches a power management that monitors CPU activity and dependent upon the type of activity, controls the frequencies of the CPU clock signal and system clock signal (Abstract; Fig. 6). Furthermore, Gephardt teaches the clock signals be raised if certain system activities are detected and to be lowered if certain other activities are detected (col. 2, lines 23-32, lines 64-67; col. 3, lines 1-34). It would have been obvious to one having ordinary skill in the art at the time the invention was made to stop the clock only when the CPU is

processing non-critical I/O as taught by Gephardt, to prevent losing any vital information or processing that may occur during an I/O operation.

As per claim 6, Hollowell, Kikinis and Gephardt disclose the claimed invention as discussed above. However, Hollowell does not teach a CPU receiving a one of a first clock signal at a first speed or a second clock signal at a second speed and the CPU receives the first clock signal when the temperature is below the reference temperature and the receives the second clock signal when the temperature is greater than or equal to the reference temperature. Kikinis teaches that it is known to provide first and second clock signals with first and second speeds to the CPU (col. 4, lines 23-53). It would have been obvious to one having ordinary skill in the art at the time the invention was made to include the above as taught by Kikinis, to provide different clock speeds based upon the required load of the CPU.

As per claims 30 and 31, Hollowell and Kikinis disclose the claimed invention as described in the above claims. However, Hollowell and Kikinis do not teach the clock manager stops clock signals from being sent to a PCI bus coupled to the CPU or any other CPUs coupled to the PCI bus. Gephardt teaches that the above features are well known (Fig. 2, col. 11, lines 13-21). It would have been obvious to one of ordinary skill in the art at the time the invention was made to include the above features, as taught by Gephardt to more efficiently conserve power by managing power also to external devices.

As per claims 33-39, Hollowell, Kikinis, and Gephardt disclose the claimed invention as described above. However, Hollowell does not teach the monitor is on board the CPU and the

monitor detects via a temperature sensor. Kikinis teaches that it is known to have a monitor on the board with the CPU and the monitor detects via a temperature sensor (Fig. 2, 3; col. 3, lines 8-10). It would have been obvious to one of ordinary skill in the art at the time of the invention to include the above features as taught by Kikinis, to provide an accurate and efficient way to measure temperature.

As per claims 41-43, 45-47, and 49-51, Hollowell, Kikinis, and Gephardt disclose the claimed invention as described above. Furthermore, Hollowell and Kikinis teach that the temperature sensor is located on the CPU board (Fig. 1) or on the CPU (Fig. 3). The location of the temperature sensor is dependent upon the area of concern. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to locate the temperature sensor as taught by Hollowell and Kikinis to provide the system designer the freedom to measure in close proximity to area of temperature concern.

As per claim 53-55, Hollowell, Kikinis and Gephardt disclose the claimed invention as described above. Furthermore, Hollowell teaches the temperature sensing device may be a thermistor (col. 6, lines 31-33).

As per claim 57-59, Hollowell, Kikinis and Gephardt disclose the claimed invention as described above. Furthermore, Hollowell teaches the temperature sensing is monitored periodically (col. 6, lines 46-47).

As per claim 61-63, Hollowell, Kikinis and Gephardt disclose the claimed invention as described above. Furthermore, Hollowell teaches the frequency of temperature sensing changes as the temperature reaches a preselected threshold value (col. 7, lines 44-50).

As per claim 65-67, Hollowell, Kikinis and Gephardt disclose the claimed invention as described above. However, Hollowell does not teach that the temperature sensing is user modifiable. Kikinis teaches that it is known for the temperature sensing to be user modifiable (col. 5, lines 64-66). It would have been obvious to one of ordinary skill in the art at the time the invention was made to include the user modifiable temperature sensing as taught by Kikinis to give the user the flexibility to adjust the temperature sensing for testing purposes.

As per claim 71-73, Hollowell, Kikinis and Gephardt disclose the claimed invention as described above. However, Hollowell does not teach the monitor uses a control system of continuous feedback loops. Kikinis teaches that it is known to use a control system of continuous feedback loops (Fig. 3). It would have been obvious to one of ordinary skill in the art at the time of the invention to include the continuous feedback loops as taught by Kikinis, to maintain and regulate the temperature in the IC to prevent large temperature swings which causes excess power and could cause physical damage to the components.

2. Claims 17-21, and 23, are rejected under 35 U.S.C. 103(a) as being unpatentable over Hollowell, II et al in view of Kikinis and further in view of Chen et al.

As per claims 17, 18 and 21, Hollowell and Kikinis disclose the claimed invention including monitoring temperature levels in a computer. However, Hollowell and Kikinis do not

teach predicting activity and temperature levels relevant to the operation of a CPU within the computer and using the predictions for automatic temperature control. Chen teaches that it is known to predict activity levels within a computer and using the prediction for automatic control and also, remain transparent to the user (col. 7, lines 4-24). It would have been obvious to one having ordinary skill in the art at the time the invention was made to include the above as taught by Chen, since having the capability to predict temperature rises and automatically control them, prior to the occurrence could prevent premature failure of the CPU or circuit components.

As per claims 19, 20, and 23, Hollowell and Kikinis teach the disclosed invention as claims 17, 18, and 23 above. However, Hollowell and Kikinis do not teach user modification of automatic activity and temperature level predictions and using modified predictions for automatic temperature control. Chen teaches that it is known to allow user modification of automatic activity level predictions and using the modified predictions for automatic control (col. 7, lines 5-43; col. 8, lines 1-6). It would have been obvious to one having ordinary skill in the art at the time the invention was made to include the above as taught by Chen, since allowing the user to modify temperature levels would allow for different manufacturer's components that have various temperature specifications.

*(11) Response to Argument*

a. In response to applicant's arguments that Gephardt does not teach "critical activity" it is noted that Gephardt teaches detected activities and list some of the type that are detected, and also Gephardt teaches that other selected activities may be programmed as either primary or secondary activities (col. 3, lines 30-33). Thus, Gephardt reads on the claims limitations of detecting "critical activity".

b. In response to applicant's arguments that Gephardt does not teach, stopping or reduces clock speed when said clock speed rises to a level at and above a selected reference temperature level and said CPU is not processing critical I/O, it is noted that Gephardt teaches that the CPU clock signal is stopped during the suspend state (col. 3, lines 14-15). Furthermore, Gephardt teaches the steps of detecting activity of the processor and providing a clock control signal to the CPU clock (col. 3, lines 50-61). Also, Gephardt teaches the power management unit can be configured to control only selected clock signals of the computer system or to control only the application of power to various peripheral device (col. 11, lines 15-21). Finally, Hollowell and Kikinis are cited to teach the limitations of the thermal management system and stop the clock signals rise above a reference temperature level. The combination of Gephardt into the system of Hollowell and Kikinis teaches the claimed limitations. Gephardt adjusts the clock based upon detected activity and Kikinis also adjusts the clock based upon detected activity, thus, the cited references are both in the same field of endeavor and by reducing the clock as taught by Gephardt

into the system of Kikinis, reduces the power consumption which reduces heat generation and thereby increases reliability and decreases cost.

c. In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

d. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992).

e. In response to applicant's arguments that Chen does not teach, sampling temperature levels and predicting temperature levels associated with the operation of the central processing unit and using the prediction for automatic control of temperature within the computer, it is noted that Chen teaches that it is known to predict heat accumulation and heat

dissipation of the CPU as functions of both time and operating frequency and the system provides temperature control based upon a selected model which is built upon a sample of sample temperature changes which are linearly proportional to the amount of time of operation of a CPU at a particular frequency (col. 1, lines 34-50). Furthermore, Chen teaches the microprocessor operates with different speed modes which cause heating of the device and increased power consumption which leads to overheating of a chip and to thermal instabilities and then to failure of transistors of the entire chip (col. 1, lines 11-18). Thus, Chen reads on the claim limitations as currently cited.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

AYAZ R. SHEIKH
SUPERVISORY PATENT EXAMINER
GROUP 2700

RDD
April 20, 1999